128,000 tons of coal are imported, mainly from New South Wales; but about 80,000 tons are exported, 47,115 tons of which are returned as going to the United Kingdom. It is not, however, shown what the latter quantity is, whether it is a special gas coal or merely coal taken by steamers for English ports.

The detailed reports from the different districts contain some matters of general interest, among which may be noticed the use of dredgers for raising auriferous drift from the beds of rivers, which has been successfully carried out by the Waipapa Company on an ocean beach by a Welman centrifugal-pump dredger, about £300 worth of gold per week being saved from sand and gravel, yielding about 3 grains or sixpence in value per ton. This dredger is not suitable for lifting coarse material, and where the stuff contains stones above 3 inches across, the ordinary bucket and ladder system is found to be more advantageous. Among the reducing processes noticed, that of Messrs. Macarthur and Forest, for dissolving out gold and silver by a weak solution of an alkaline cyanide and precipitating by filtering the liquors through granulated zinc, is the greatest novelty. This is described in several places, both under its own name and as the Cassel process, as it has been taken up by the Cassel Company of Glasgow in place of the original, but defunct process of Cassel for chlorinating gold ores by the electrolysis of common salt.

Astronomical Lessons. By John Ellard Gore. (London: Sutton, Drowley, and Co., 1890.)

WE greet with pleasure all works that have for their object the exposition of the principles and facts of astronomy, for this is the science which, perhaps above all others, is pursued for its own sake, and the end of the study of which is knowledge, pure and simple. It is especially satisfactory to meet with works of this character when written by practical men, hence we view with gratification the little book before us. All astronomers are acquainted with Mr. Gore's astronomical labours, and to them the productions of his pen need no recommendation. As might be supposed, the best chapters are on "Double and Binary Stars" and "Variable Stars." Other chapters deal with the figure and motions of the earth, the sun, and planets, and the measurement of time. We note that Mr. Gore, while asserting that the nebulæ are probably masses of glowing gas, does not put forward the now exploded notion that nitrogen is one of the main constituents.

The book may well be said to be an easy introduction to larger and more advanced works on astronomy, and a useful guide to beginners in the study of this fascinating science.

Soap-Bubbles. By C. V. Boys, F.R.S. "Romance of Science Series." (London: Society for Promoting Christian Knowledge, 1890.)

EVERYONE who has attended lectures delivered by Mr. Boys must have been struck by his ingenuity and zeal in designing and performing experiments illustrative of the subject he has under consideration. The present little work consists of a course of three lectures he delivered to a juvenile audience at the London Institution, and the subject dealt with is one in connection with which a great number of experiments can be performed. The author's idea throughout has been, not to display a large number of hard experiments, but to perform, by means of the simplest apparatus (in many cases only a few pieces of glass, india-rubber tubing, and other simple things readily obtained), interesting and instructive experiments that may be easily repeated by young people with a little care and patience. In order to facilitate the repetition of most of them, he has added some practical hints at the end of the volume, by the careful perusal of which the reader will be fully rewarded. It is unnecessary to allude to the special points touched on in the course of these lectures: suffice it to say that the book is written in simple and clear language, and illustrated with a set of excellent woodcuts. We may note that the figure placed at the end can be easily converted into a thaumatrope for showing the formation and oscillations of drops. If the disk, made to rotate, be held up to a looking-glass, the drop will first appear to form; it then gradually increases in bulk, changing its form all the time; at a particular stage a waist is formed, which grows narrower and narrower until the drop falls. The trouble of mounting the illustration in the specified way will be amply repaid by the interesting phenomena mentioned above.

The Canary Islands. By John Whitford, F.R.G.S. (London: Edward Stanford, 1890.)

IN this little book Mr. Whitford records the impressions produced upon him during a tour in the Canary Islands. He has chapters on Grand Canary, Tenerife, La Palma, Gomera, Hierro, Lanzarote, and Fuerteventura; and as he writes clearly, and displays a considerable power of observation, the volume should be of interest even to readers who do not themselves propose to undertake a like journey. In his travels the author always had his camera with him, and some of the results are seen in the pleasant woodcuts with which his descriptions are illustrated.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

A Remarkable Ice-Storm.

IN March 1884 I wrote to you in regard to a heavy ice-storm which we had experienced on the 7th and 8th days of that month, giving some statistics as to the thickness of the ice deposits on trees and as to the weight which the extremities of branches were carrying. I can now report to you a more remarkable storm of the same kind, the effects of which still continue more than sixty hours after the storm has ceased; and there seems to be little hope that the morrow will give us an unclouded sun to loosen the casing under which the trees are labouring.

Before sunrise on the 17th instant, a light snow began, with the wind blowing gently from the north; the storm soon changed to a fine hail, which prevailed throughout the day, and by sunset had covered the ground to the depth of some two inches; then followed a rather heavy rain, the thermometer standing not far from the freezing-point. The rain ceased for a while about eight o'clock, and I found that the amount of precipitation reduced to water was 1·25 inches. Before midnight the rain began to fall again, and the ice formed rapidly on trees, fences, wires, and everything that could hold a drop of water for an instant. The amount of rain in the night, augmented by a little drizzle and a light snow on the following day, was 0·67 inch, making the total precipitation during the entire storm 1·92 inches. In the morning the appearance of everything out of doors needed but bright sunlight to make it beautiful in the extreme, except for the feeling that many trees were maimed or ruined, and that the wires on which the community depends for light and for telegraphic and telephonic communication were in a state of dire confusion. But I can best convey an idea of the effects of the storm by giving the results of some measurements which I made on our College campus.

The fence at the north side of the campus was decorated with icicles about eight inches long; the trees were covered with ice, coating every twig and hanging in icicles, which were formed of course nearly vertically, but which, as the trees bent under the increasing weight of the ice, stood out like fringes in every direction. One English elm, fifteen feet high, touched the ground with its topmost branches; its stem, 1·6 inches in diameter, carried 0·65 of an inch of ice on its most exposed

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side; the stem of another tree, having a diameter of 1·4 inches, carried 0·60 inch of ice. Twigs at the extremity of the branches of more spreading elms carried enormous loads of ice. One twig having a diameter of 0·07 inch was increased by the ice to 1·12 inches; another of the same diameter was increased to 1·26 inches; and one of 0·09 inch diameter was made 1·32 inches; that is to say, these twigs were carrying respectively fifteen, seventeen, and fourteen times their thickness of ice. Two connected twigs, taken from one of these trees, about sixteen inches long and weighing by themselves less than half an ounce, carried a little over a pound of ice; that is, they supported about thirty-five times their own weight. A few frail stems of weeds standing up from the ground carried relatively still larger amounts of ice. One which had a diameter of 0·05 inch had become increased to 1 inch, or by nineteen times its size; and one of 0·07 inch measured 1·23 inches, showing a gain of about seventeen times its size; and a bush-like weed, which weighed about a quarter of an ounce, was supporting eleven and a half ounces of ice.

When the ice had been on the trees for more than thirty hours, and there may have been a little melting, I made two additional observations as to the weight of the ice. On one twig of an elm-tree, itself weighing a decided fraction less than three-quarters of an ounce, there was found to be ice weighing over twenty-eight ounces; and on another, having a weight of three-eighths of an ounce, there was ice weighing more than nineteen ounces and a half; that is to say, in the one case the extremity of a branch was carrying at least forty times its own weight, and in the other case fifty-two times its own weight of frozen water.

The most beautiful piece of ice work on the College grounds was shown by a wire net running east and west, and placed for a guard at the end of a tennis court on the lower campus. The wire, of about 0·04 inch in diameter, was woven into hexagonal meshes, of which the horizontal sides were about an inch long, those inclined to them being longer. The wire was covered with ice to a thickness of about 1·06 inches; and from each of the horizontal sides hung an icicle curving slightly to the south, owing to the influence of the wind, and so standing free of the wire below, and attaining a length of 2½ or 3 inches. It was a wonderful specimen of the beauty of Nature's work.

The figures given above, compared with those recorded in March 1884, show that this has been a heavier storm than the former. In that case the largest proportional measurement of ice upon the twig of a tree gave an increase of but nine times the original diameter, and the largest amount of ice which I found on an upright weed-stalk was about twenty times its own diameter, while the weight of ice attached to ten ounces of twigs from a tree was less than seventy ounces. This storm, while it has recalled the lesser though remarkable ice-storm of March 1884, has also revived the memory of a storm of the same kind at Christmastide in 1855.

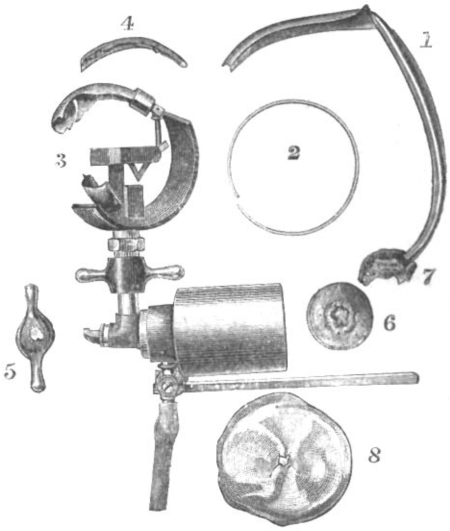
Perhaps I should add that, as the ice did not freeze on twigs, or stalks, or wires so that the cross-sections would be circular, the measurements made were those of the largest diameters in the several instances. SAMUEL HART.

Trinity College, Hartford, Connecticut, U.S.A.,
January 20.

The Bursting of a Pressure-Gauge.

AN accident caused by the bursting of a pressure-gauge attached to a compressed oxygen cylinder has recently come under my notice. As there are several points connected with it which may be of interest to those who use the oxyhydrogen light in their scientific work, I venture to send you a photograph of the remains of the apparatus, and a short description of the different parts.

The accident appears to have been brought about by the inside of the curved Bourdon tube giving way. The fusion of the metal being caused by the impact of the gas, about 35 cubic feet of oxygen escaped; the initial pressure was 115 atmospheres. The screw valve which formed part of the cylinder was fully open, so that the whole contents must have been discharged very quickly. The particles of metal which were shot out from the apparatus were found to be nearly quite spherical in shape; fragments of glass and metal fused together were also found. The metal seems to have been heated to fusion, in the same way as meteors are, by air-friction. For some time previous to the accident the gauge had been exposed to a far greater pressure than that at which it gave way. The stopcock and rubber tube leading to the jet were uninjured; from this it may be inferred that the hydrogen used in the jet, which was a blow-through one, had nothing to do with the bursting of the gauge. The injury done by the accident was, fortunately, not of a very serious character, as the larger fragments missed the assistant. Some pieces of the case penetrated a plank to a considerable depth. A similar accident has recently taken place in the north of England, attended with very serious injury to the person using the apparatus. FREDERICK J. SMITH.



1, a part of the brass case, originally circular in shape. 2, the ring which held the dial in its place. 3, the pressure-gauge. The arc-shaped piece at the top is a part of the Bourdon tube; the inner curved surface is blown outwards; the outer surface is but little injured. 4, part of the cast-iron case of the instrument; this was driven edgewise into a pine plank to the depth of about a quarter of an inch. 5, the union nut for connecting the gauge and regulator to the cylinder. This is deeply cut away by fusion. 6, the disk of the regulator, partly fused. 7, a mass of fused brass found attached to the disk. 8, the dial. The gun-metal nose of the cylinder was fused away to the depth of three-eighths of an inch.

Trinity College, Oxford, January 15.

The Darkness of London Air.

LONDONERS need not be surprised to find black fogs when it is a fact that tons of soot float in the atmosphere every day. Hoping to get some *fact* on the subject, I collected a patch of snow, equal one square link, that had lain from November 27 to December 27 last, and from which I obtained two grains of soot. Now, supposing London to cover 110 square miles, it would produce 1000 tons of soot. Imagine a month's allowance being drawn off in a line by 1000 horses! The line would extend to about four miles in length. GEORGE WHITE.

7 Mildmay Grove, Canonbury, N.

A Swallow's Terrace.

AN explanation of the curious construction which I described in NATURE of November 27 (p. 80), has been suggested to me by Mr. Vernon Harcourt, in whose boat-house it was built. It is as singular as the construction itself, and, whether right or not, is probably worth the attention of naturalists.

Let me say beforehand that the "terrace" extends for nearly two feet along the beam at one end of which the nest is placed; that it consists of a layer of mud covered with dry grass; and that it is perfectly neat and finished throughout. No one who has seen it could possibly call it, as Mr. R. H. Read does in your issue of December 25 (p. 176), "an unusually straggling nest of the swallow." I entirely agree with Mr. Harcourt in believing it to have been built for some special and definite purpose.

Mr. Harcourt tells me that last summer the birds used to perch on two tie-beams which cross the boat-house just over his boat.

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